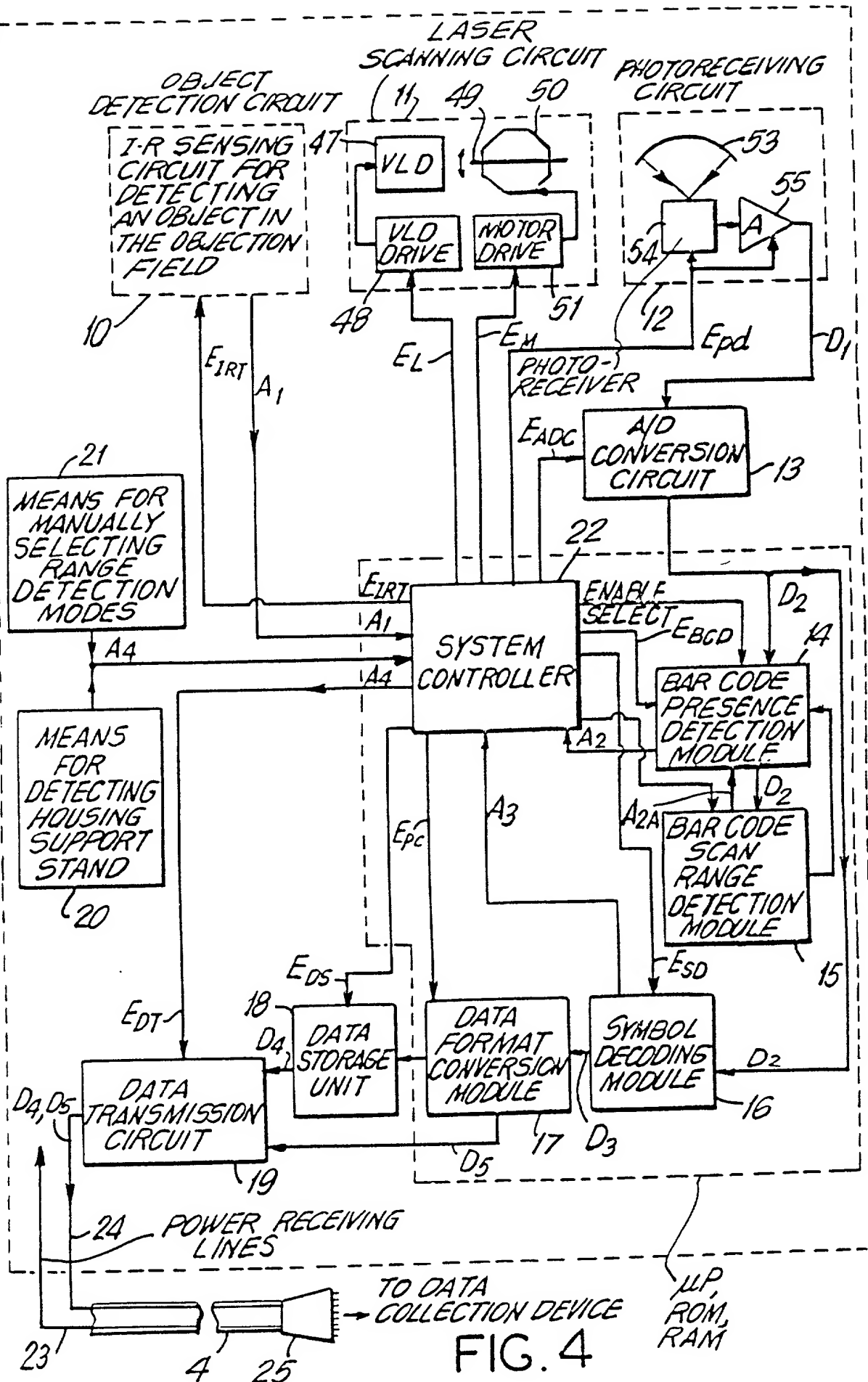


FIG. 4 is a block diagram of a system for detecting and scanning objects in a field. The system includes a laser scanning circuit, a photoreceiving circuit, an object detection circuit, and a data processing circuit. The laser scanning circuit includes a VLD (Variable Length Drive) and a motor drive. The photoreceiving circuit includes a photo-receiver and an A/D conversion circuit. The object detection circuit includes an I-R sensing circuit for detecting an object in the objection field. The data processing circuit includes a system controller, a bar code presence detection module, a bar code scan range detection module, a data format conversion module, a symbol decoding module, a data storage unit, and a data transmission circuit. The system is powered by power receiving lines (24) and a data collection device (23). The system controller (22) is connected to the laser scanning circuit (11), the photoreceiving circuit (12), the object detection circuit (10), the bar code presence detection module (14), the bar code scan range detection module (15), the data format conversion module (17), the symbol decoding module (16), the data storage unit (18), and the data transmission circuit (19). The system controller (22) also receives input from the means for manually selecting range detection modes (21) and the means for detecting housing support stand (20). The system controller (22) outputs control signals to the laser scanning circuit (11), the photoreceiving circuit (12), the object detection circuit (10), the bar code presence detection module (14), the bar code scan range detection module (15), the data format conversion module (17), the symbol decoding module (16), the data storage unit (18), and the data transmission circuit (19). The system controller (22) also receives data from the bar code presence detection module (14), the bar code scan range detection module (15), the data format conversion module (17), the symbol decoding module (16), the data storage unit (18), and the data transmission circuit (19). The system controller (22) is also connected to a microprocessor (μP), ROM, and RAM.



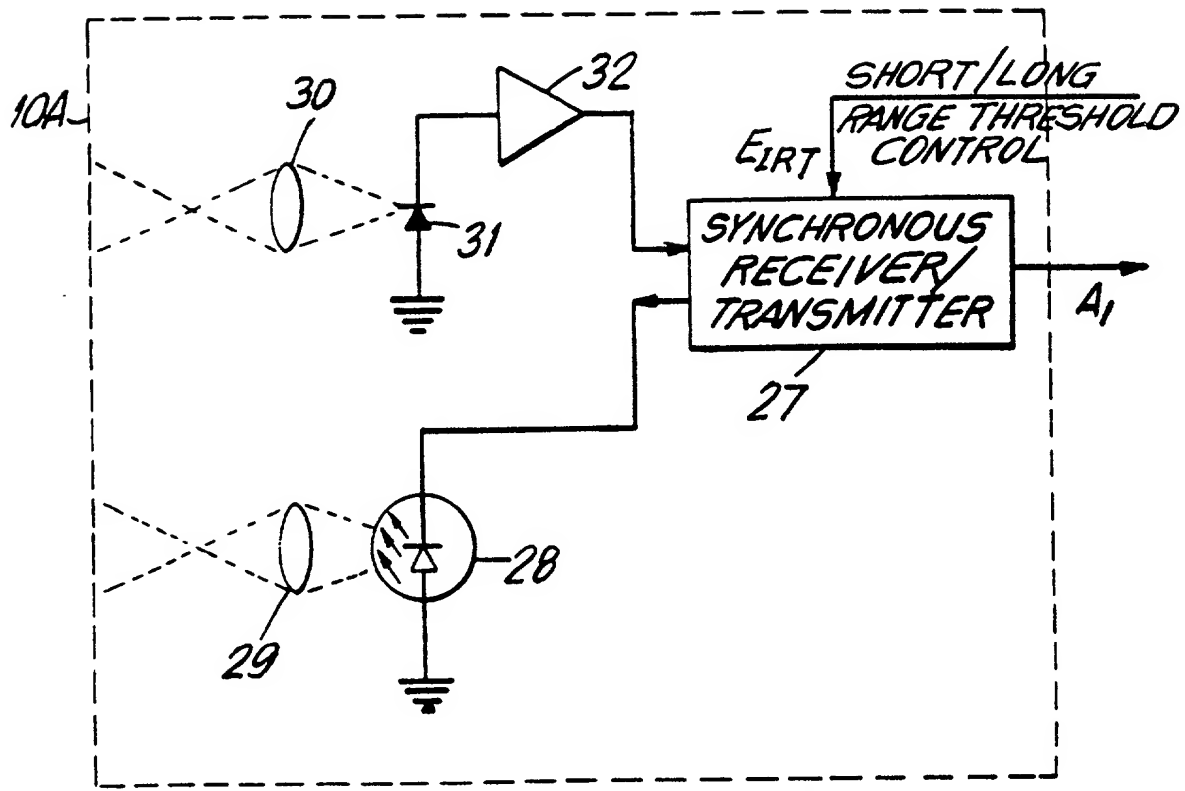


FIG. 5

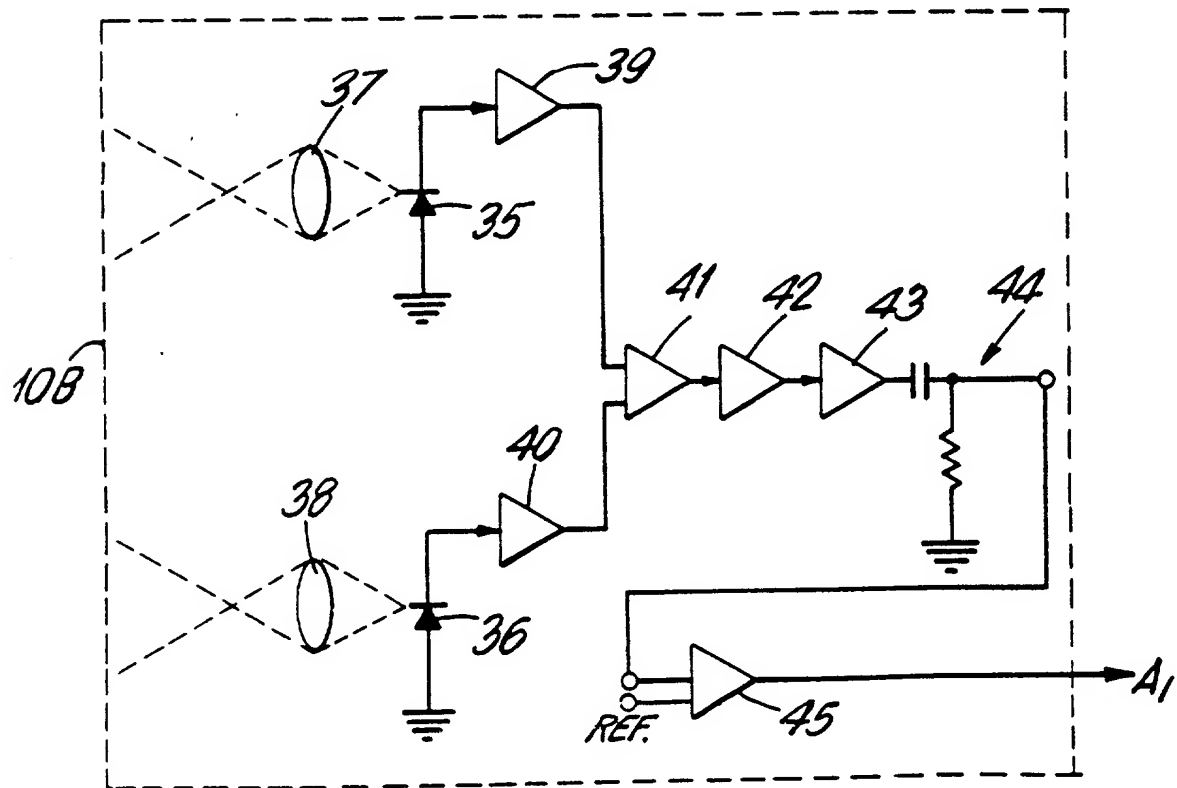


FIG. 6

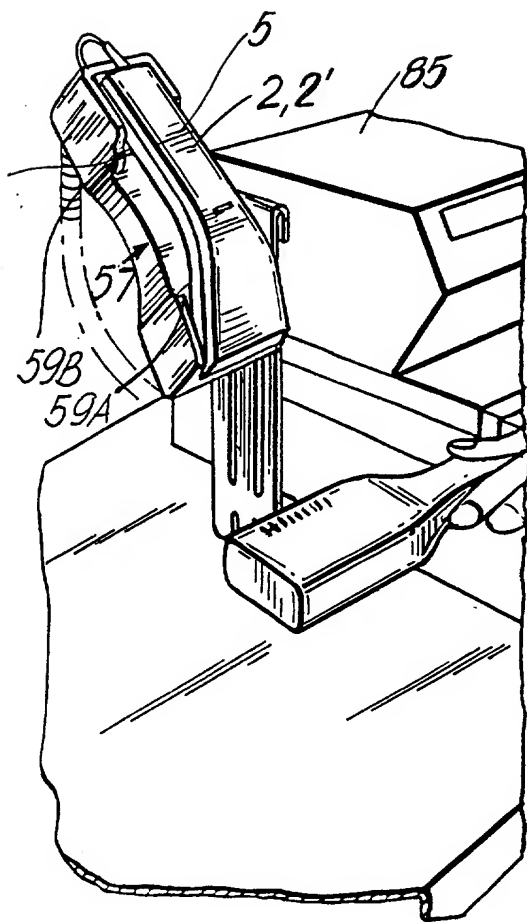


FIG. 7A

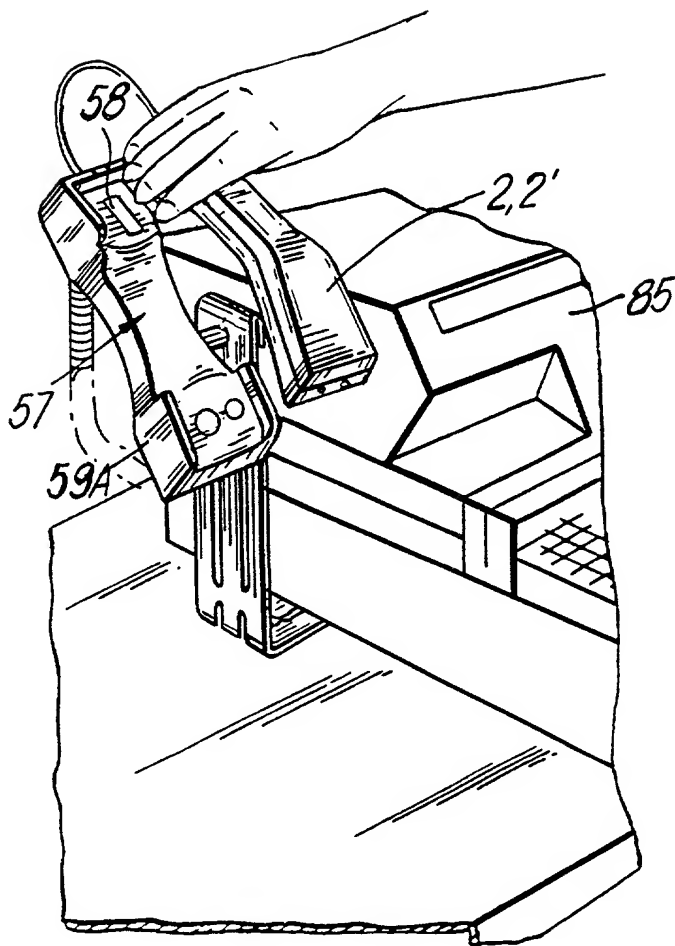


FIG. 7B

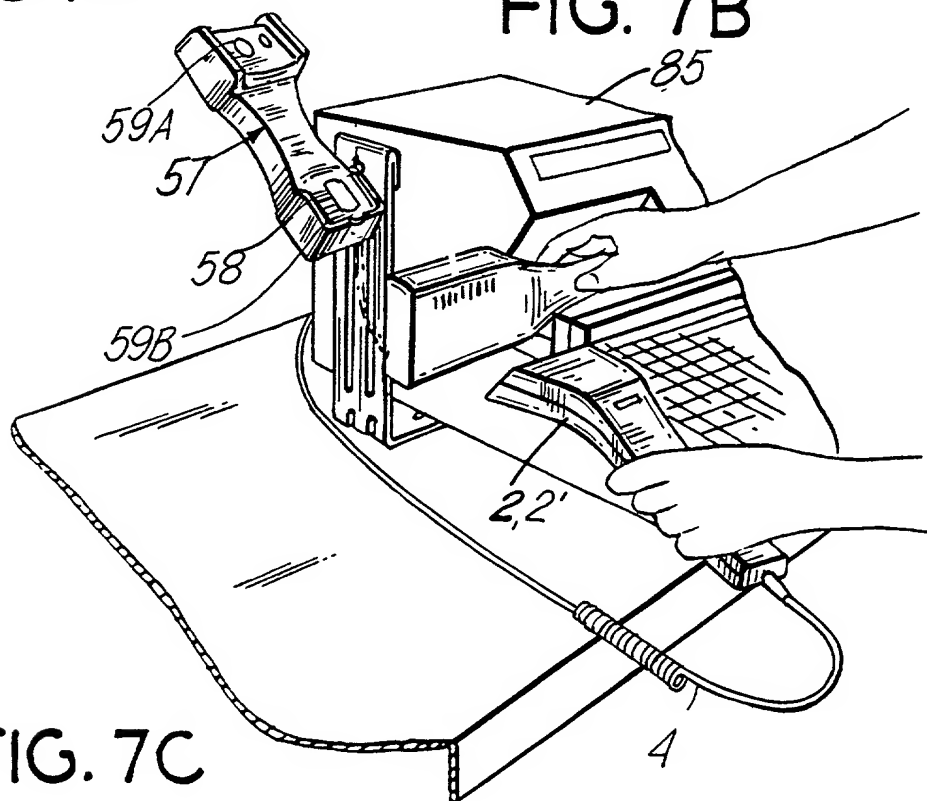
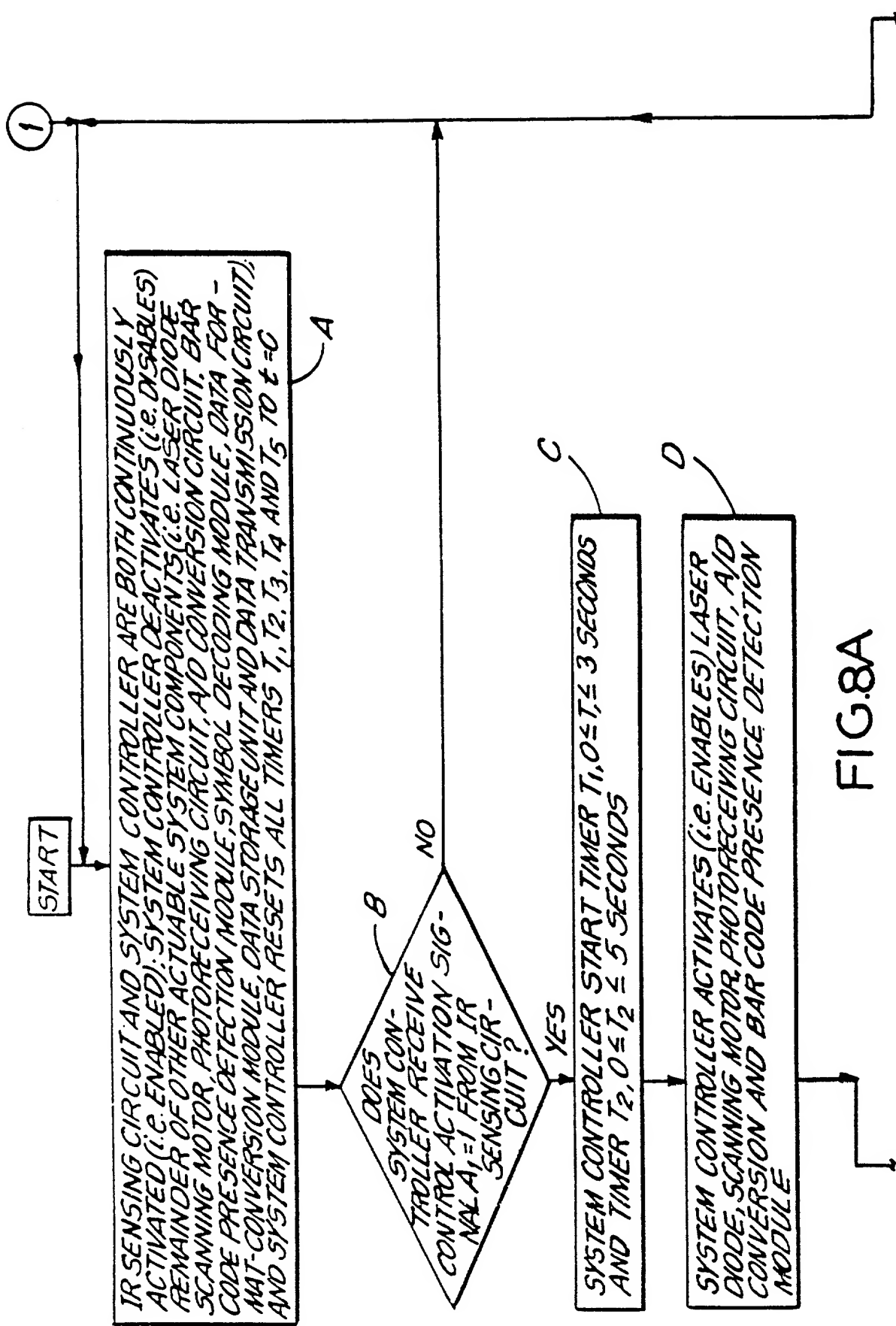


FIG. 7C



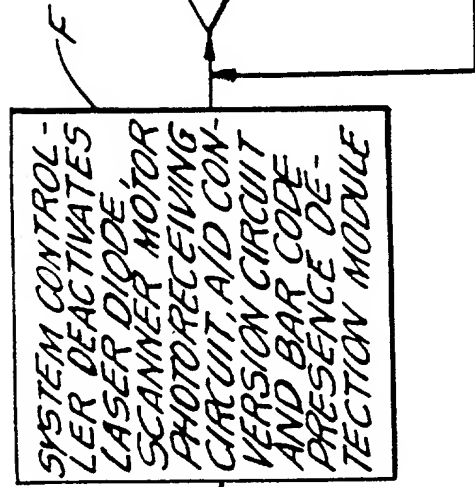
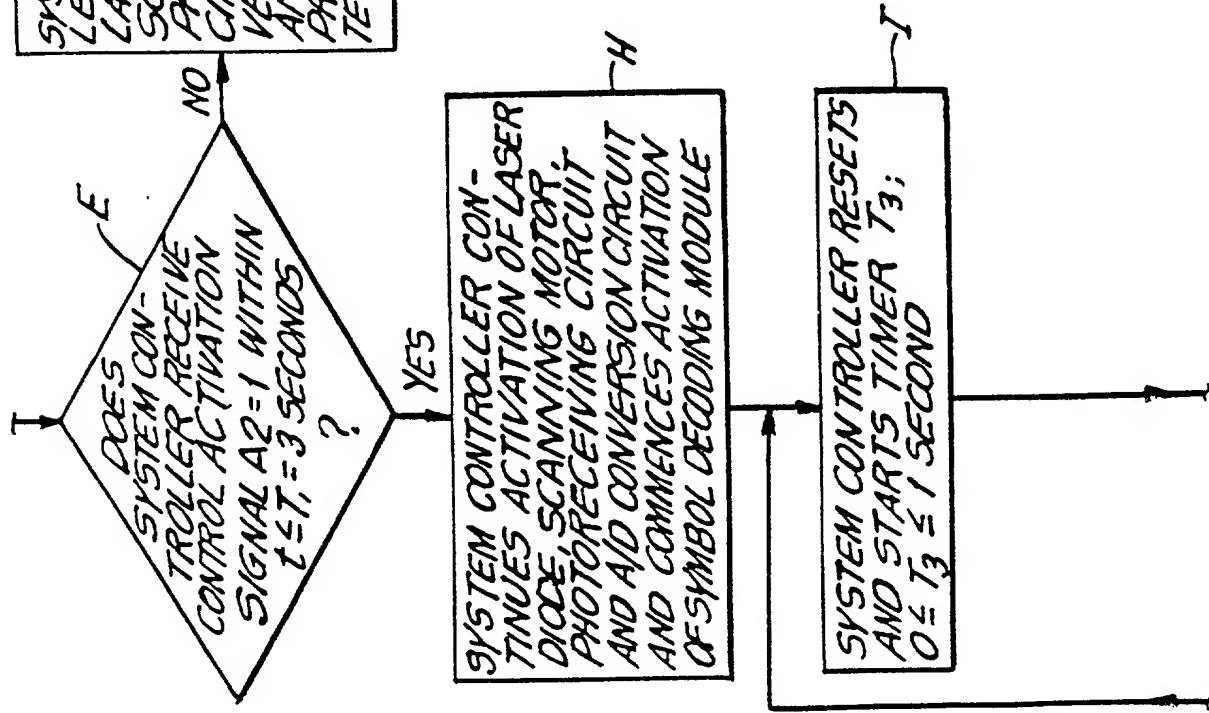


FIG.8B

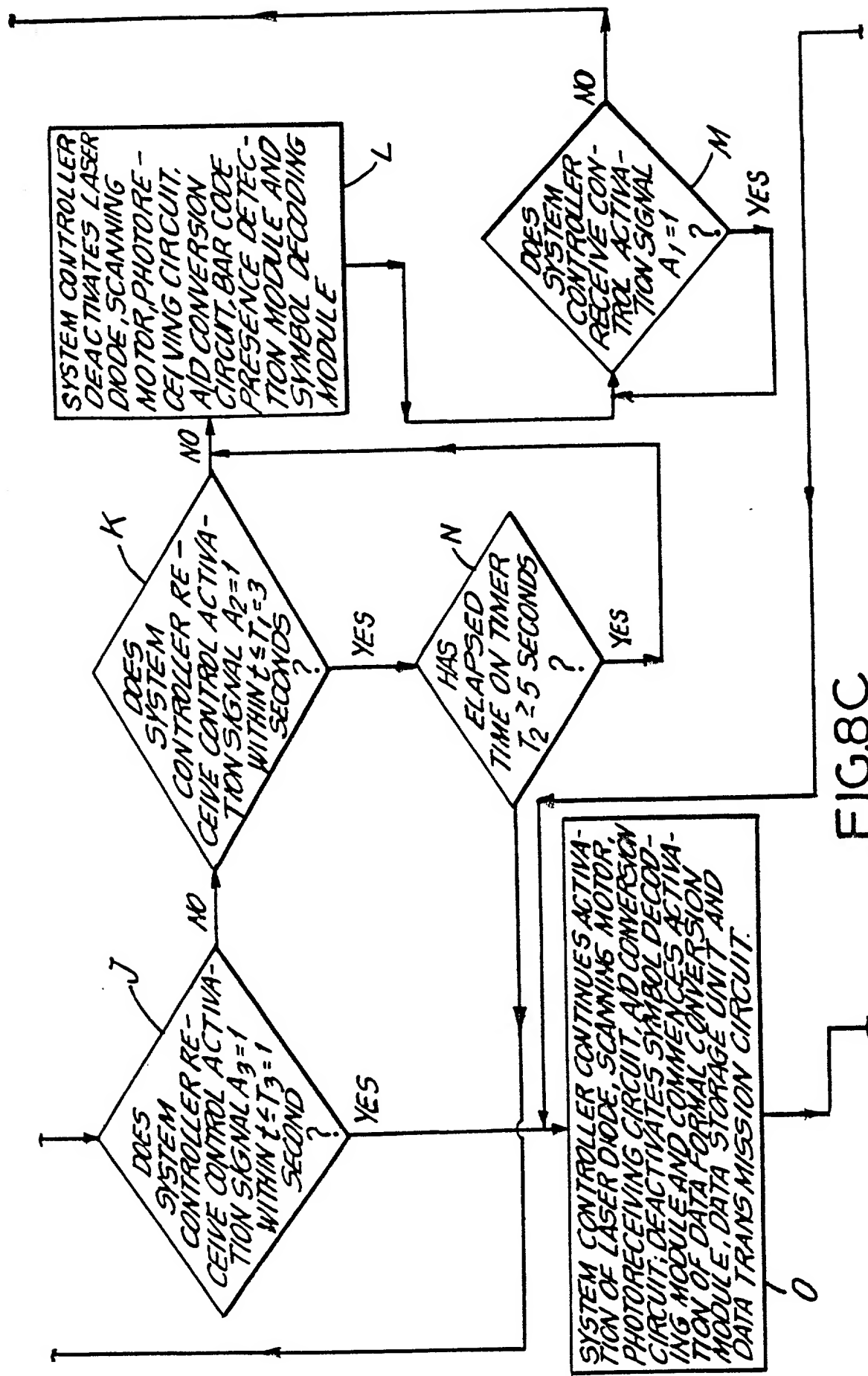


FIG.8C



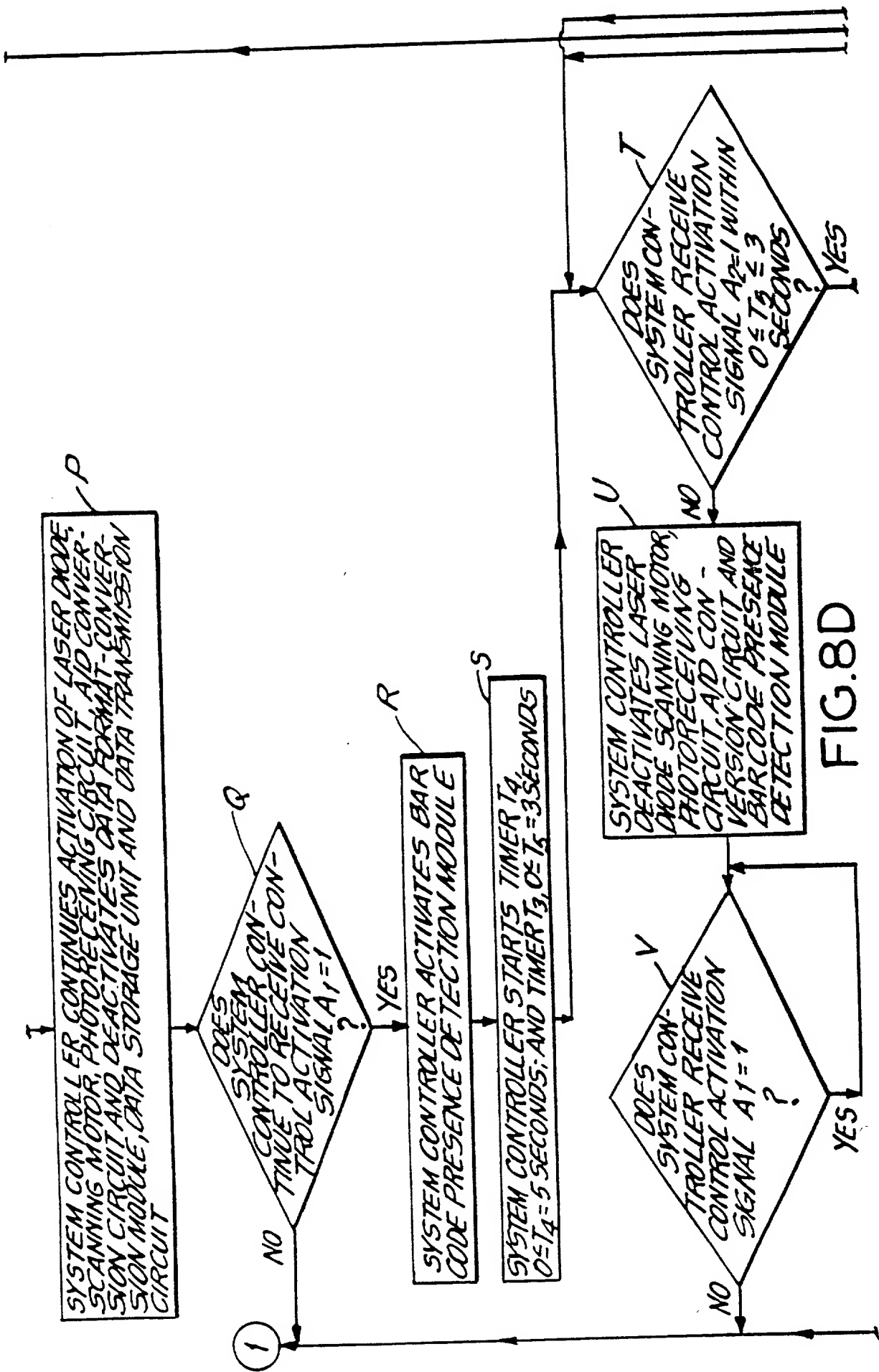


FIG. 8D

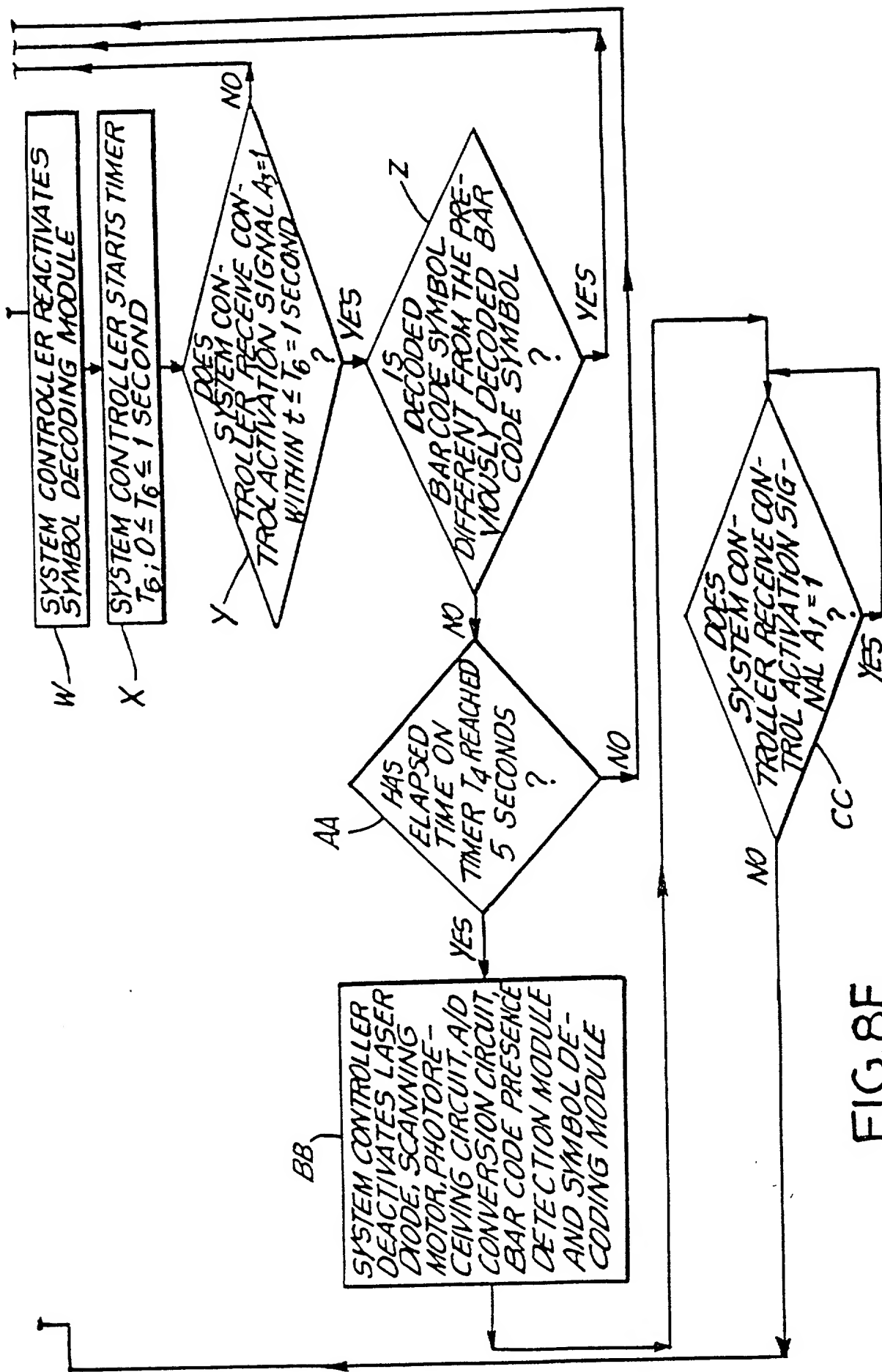


FIG. 8E

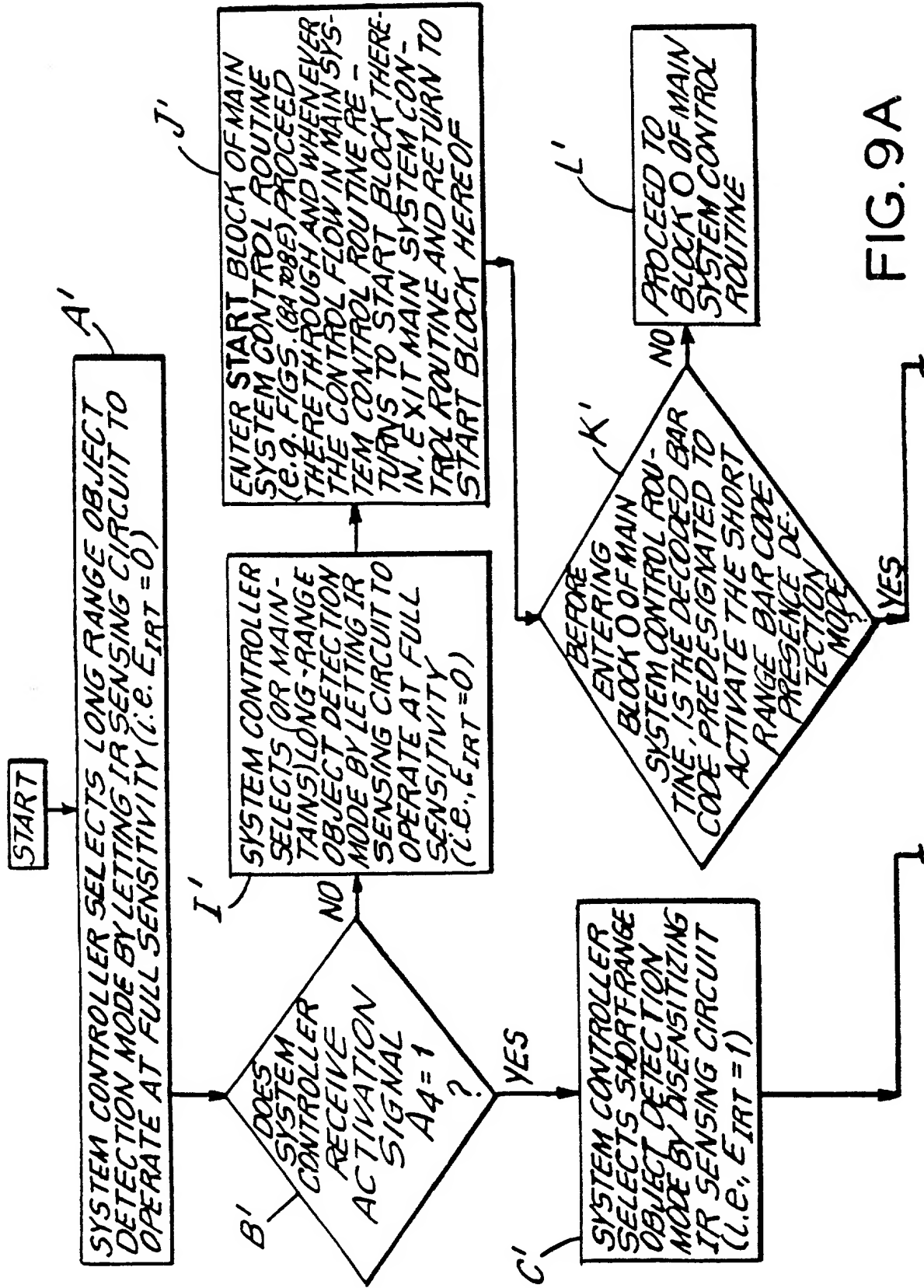
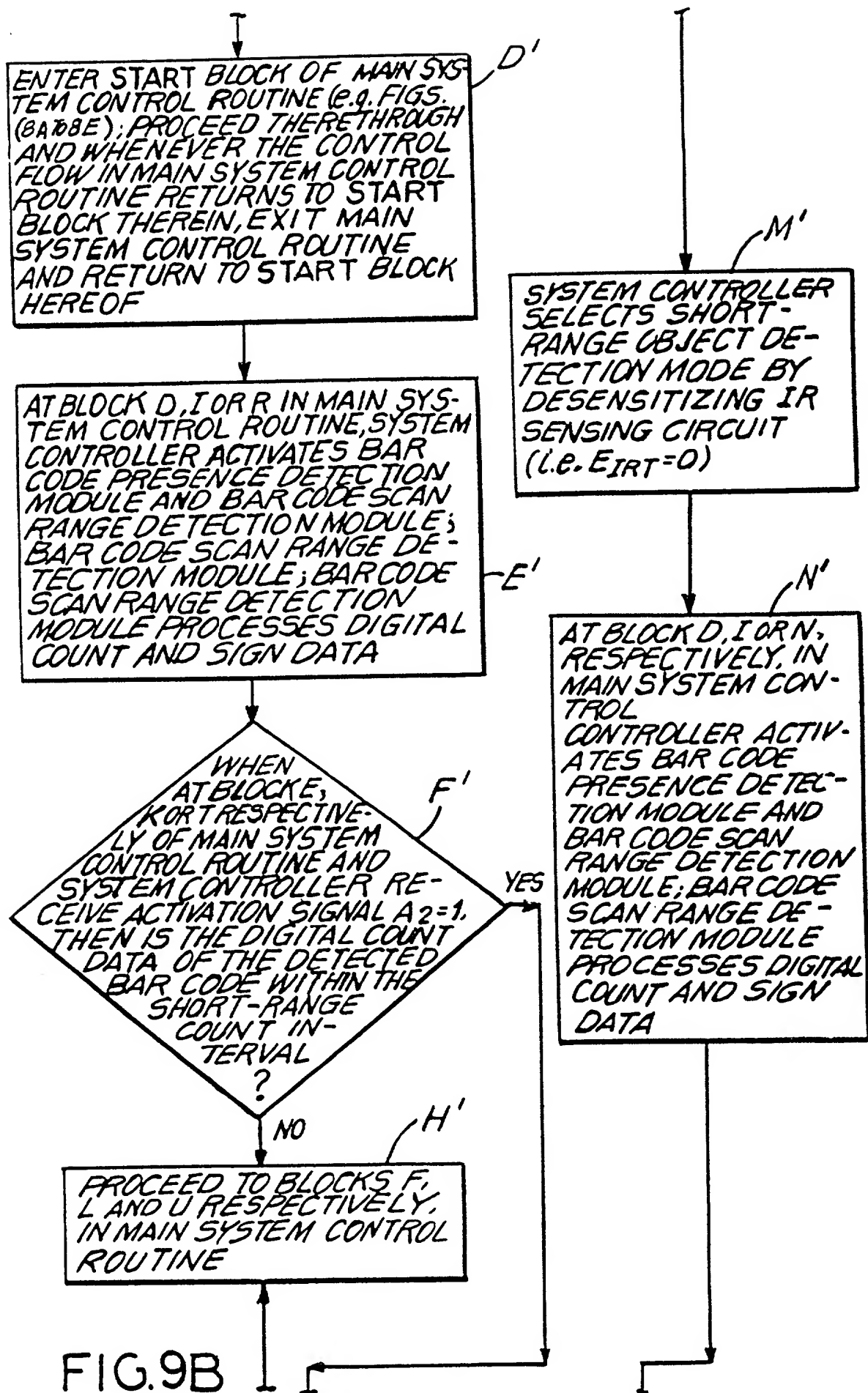


FIG. 9A



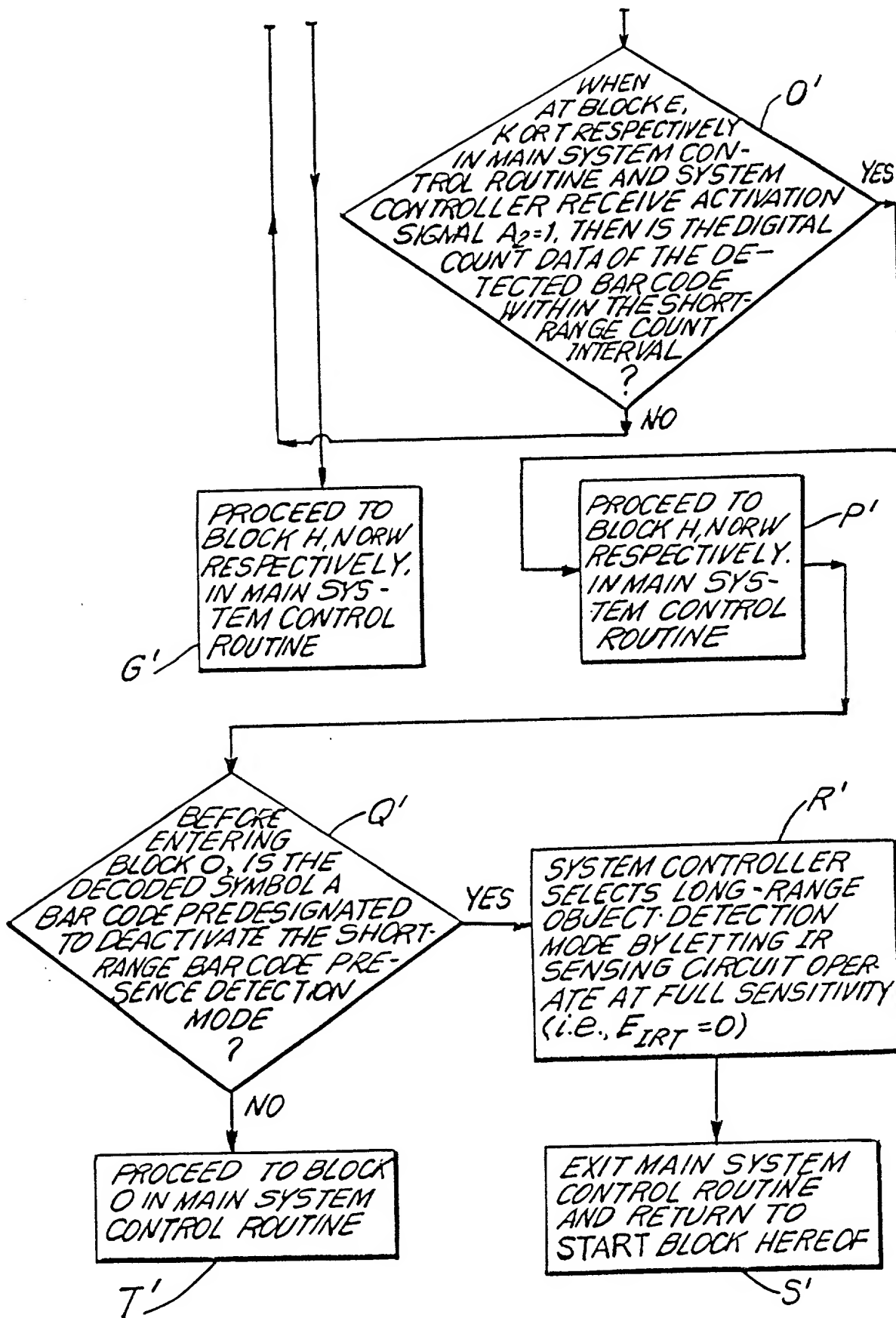
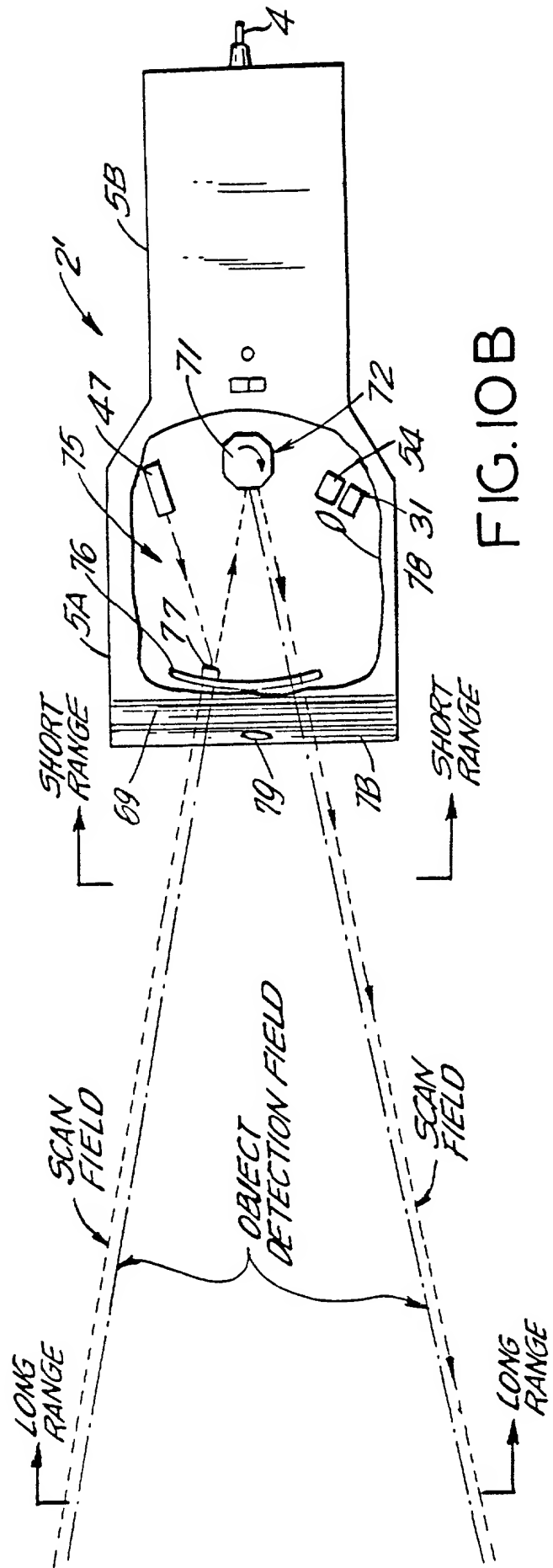
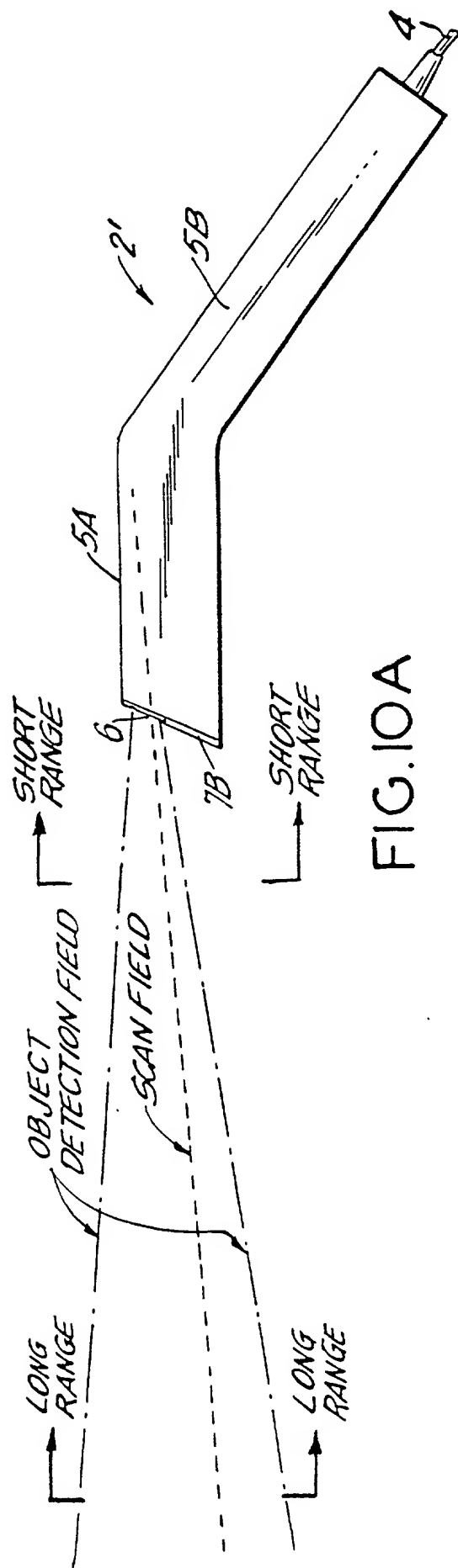
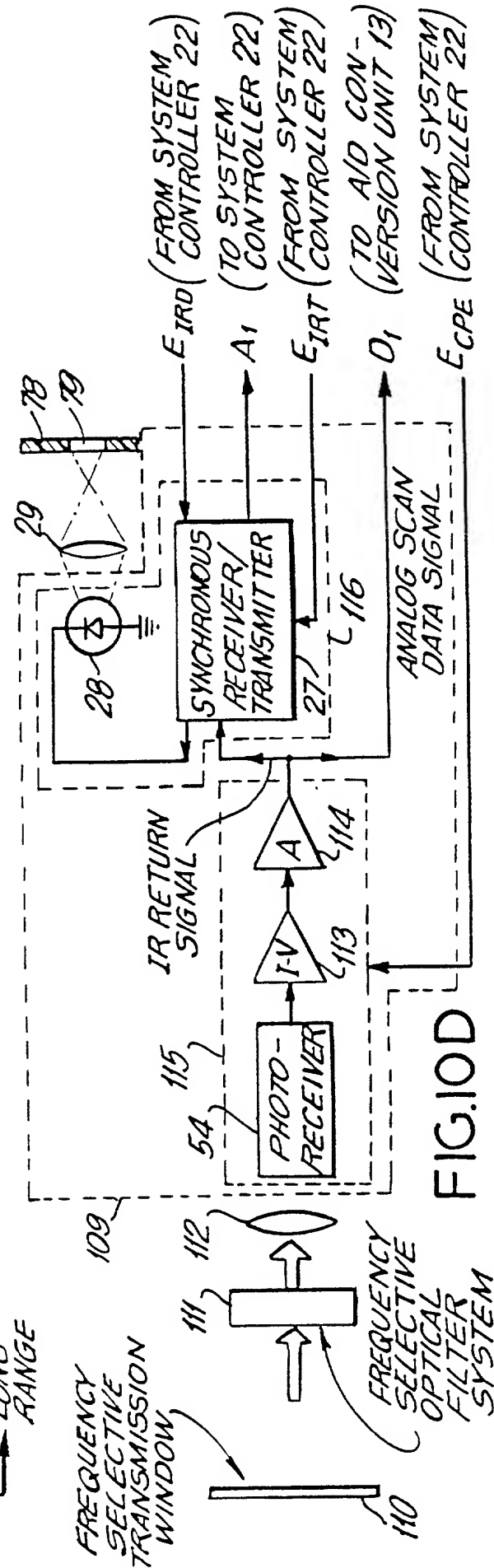
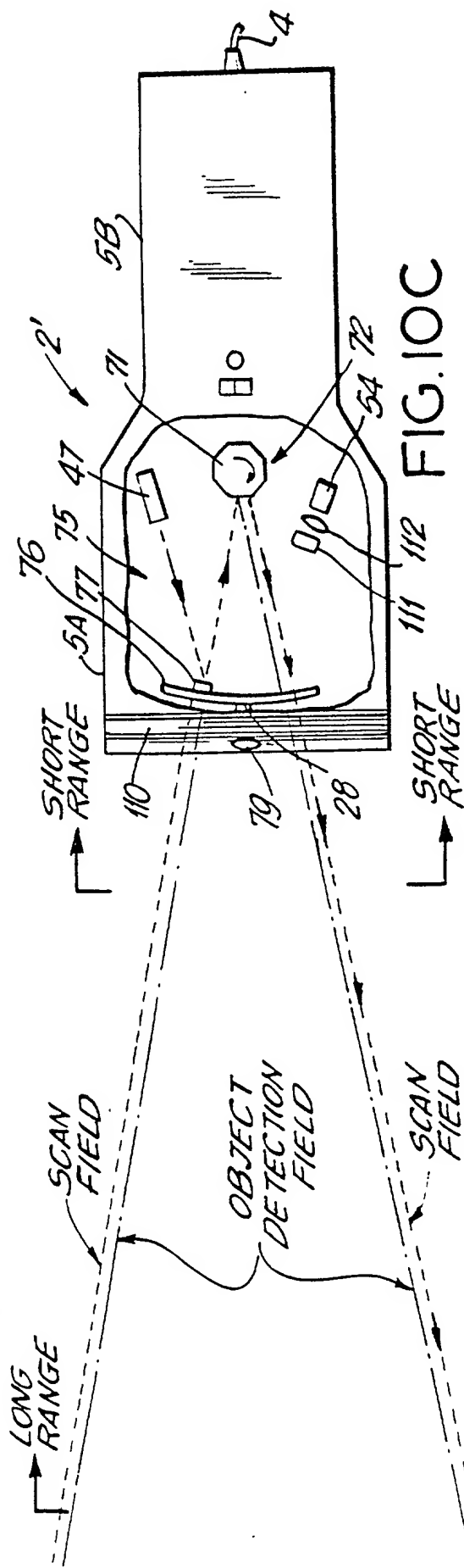


FIG. 9C





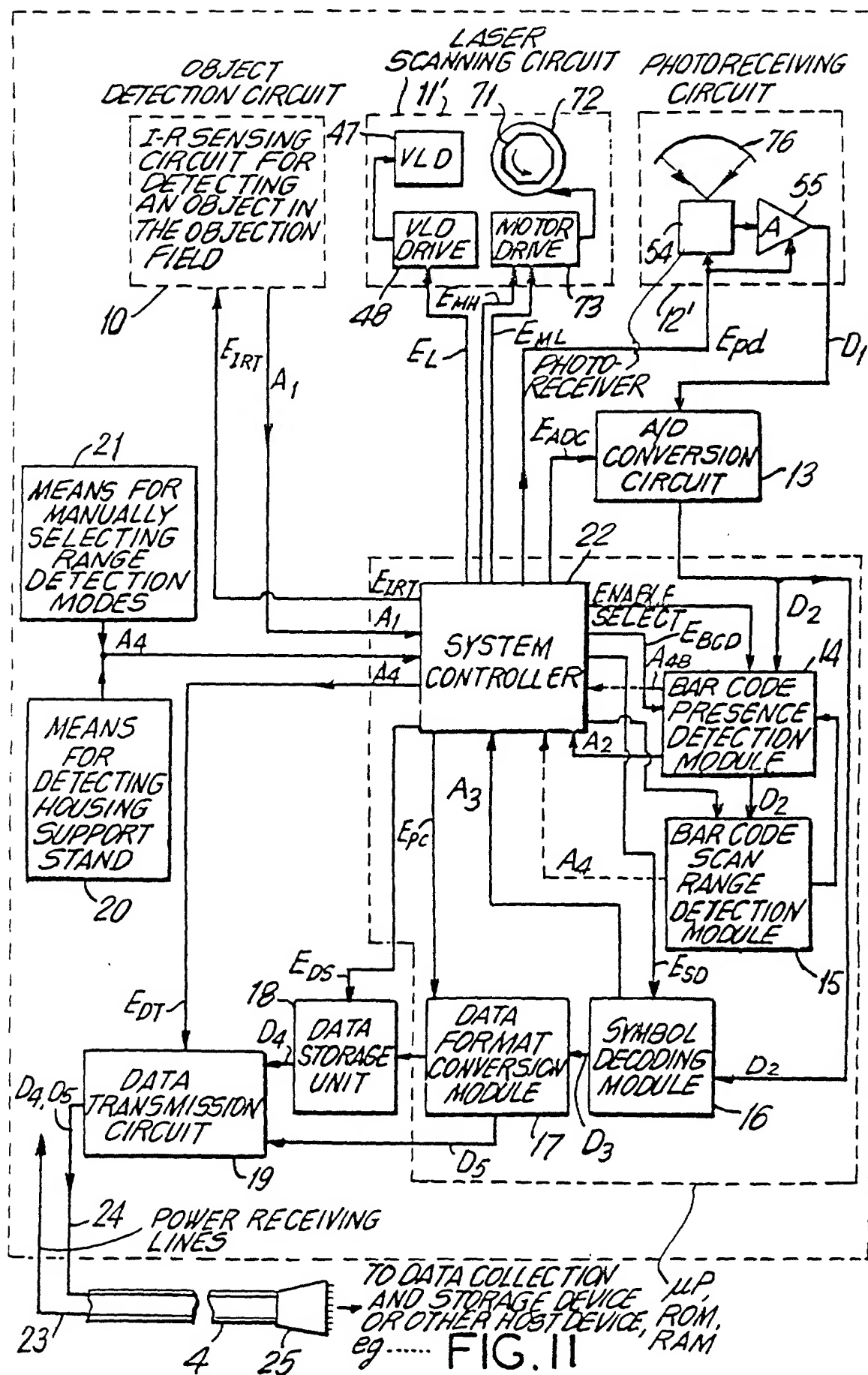




FIG. 12A is a flowchart illustrating a system control process. The process begins at a START block, leading to a process block (A) where the system controller is continuously activated (i.e., enabled). The system controller activates the IR sensing circuit with the scanning motor driven at low speed. The system controller deactivates (i.e., disables) the remainder of the other activatable system components (i.e., laser diode, photo-receiving circuit, and conversion circuit, bar code presence detection module, data storage unit, and data transmission circuit). The system controller resets all timers T1, T2, T3, T4, and T5 to t=0. The process then enters a decision block (B) asking if the system controller receives a control activation signal A1=1 from the IR sensing circuit. If YES, the process proceeds to block (C) where the system controller starts timer T1 (0 ≤ T1 ≤ 3 seconds) and timer T2 (0 ≤ T2 ≤ 5 seconds). If NO, the process proceeds to block (D) where the system controller deactivates the IR sensing circuit and the scanner motor driven at low speed, and activates (i.e., enables) the laser diode, scanning motor at high speed, photo-receiving circuit, and conversion circuit, and bar code presence detection module, and deactivates the IR sensing circuit. The process then loops back to the START block.

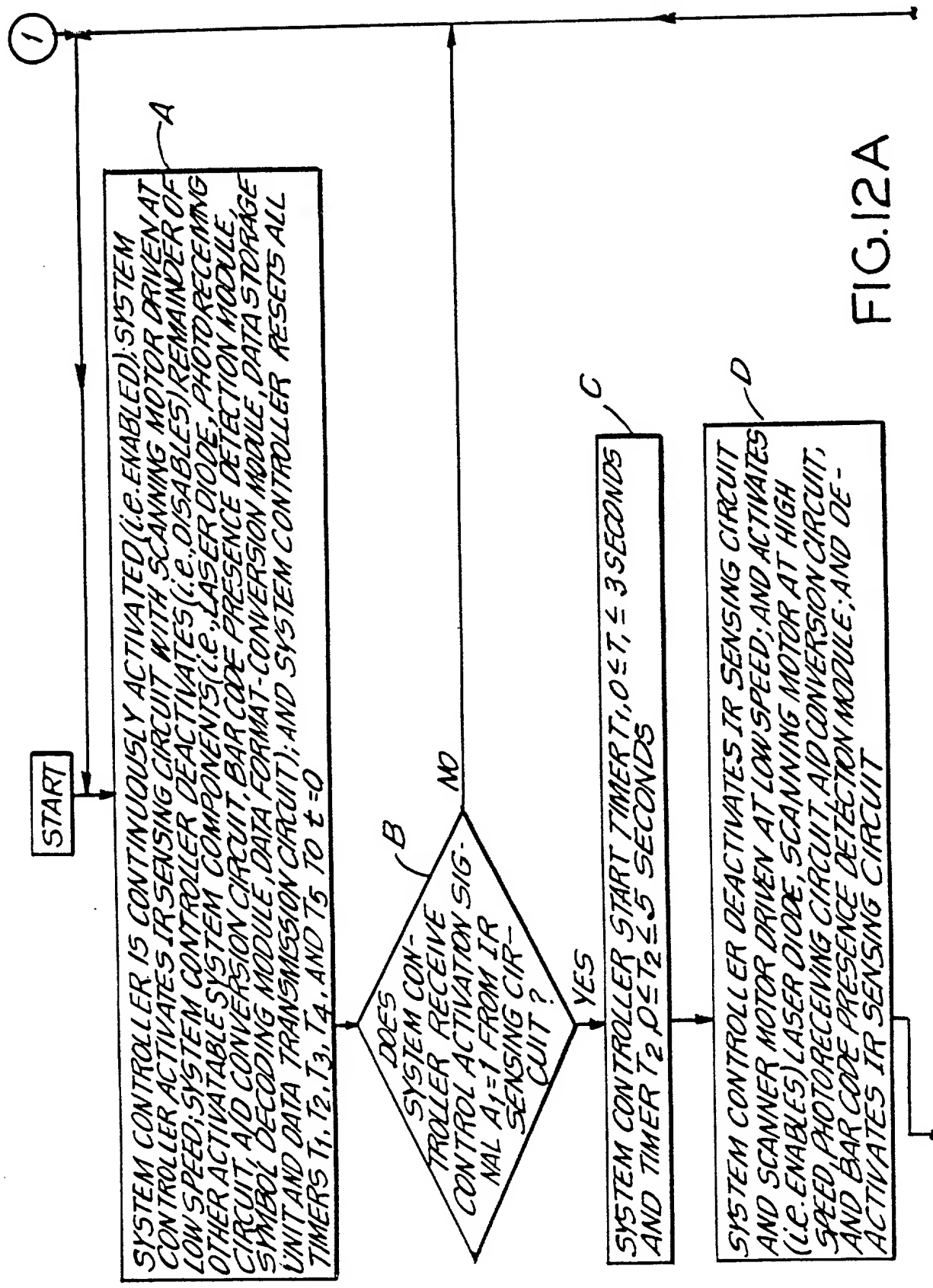
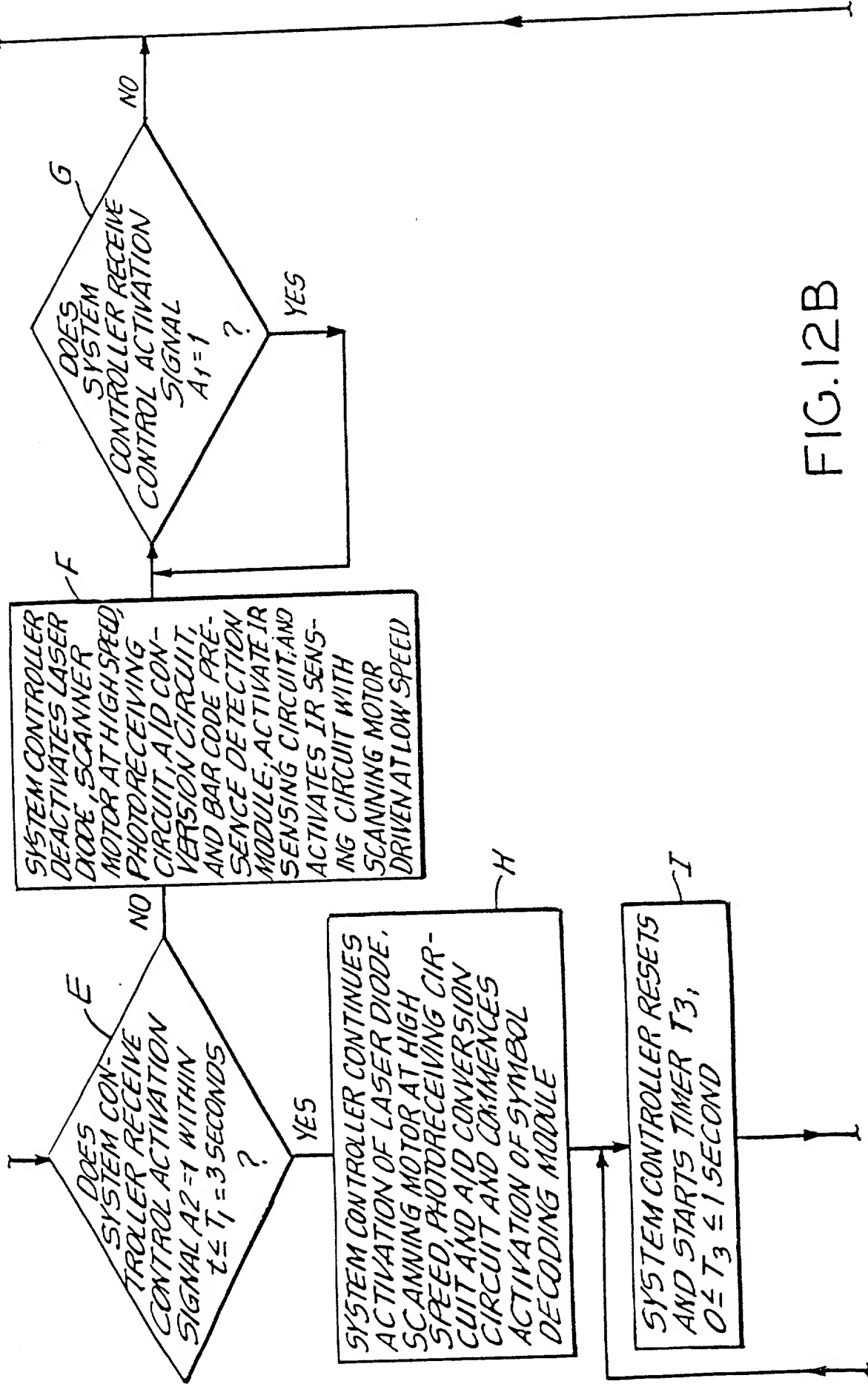


FIG. 12A



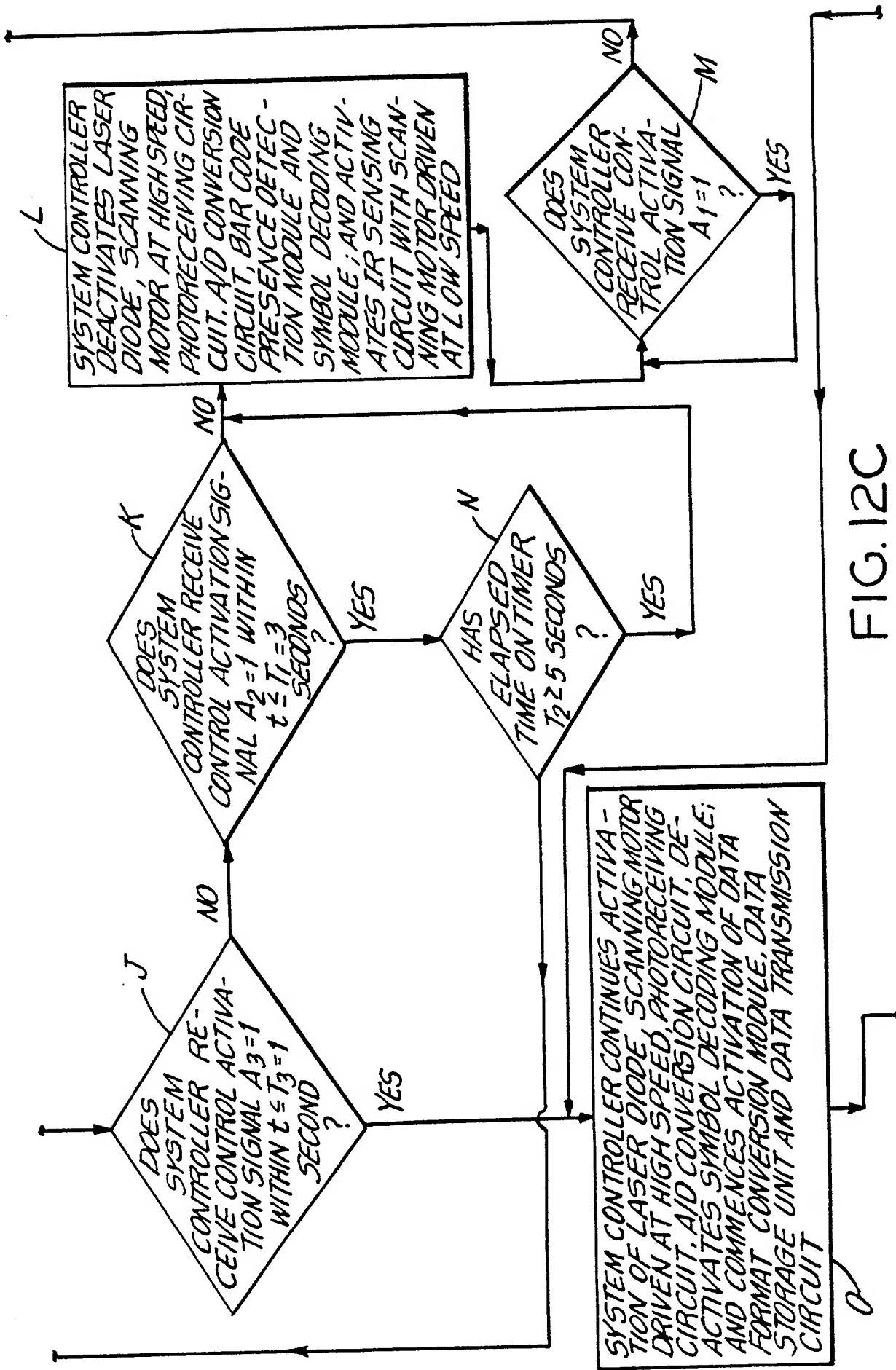


FIG. 12C

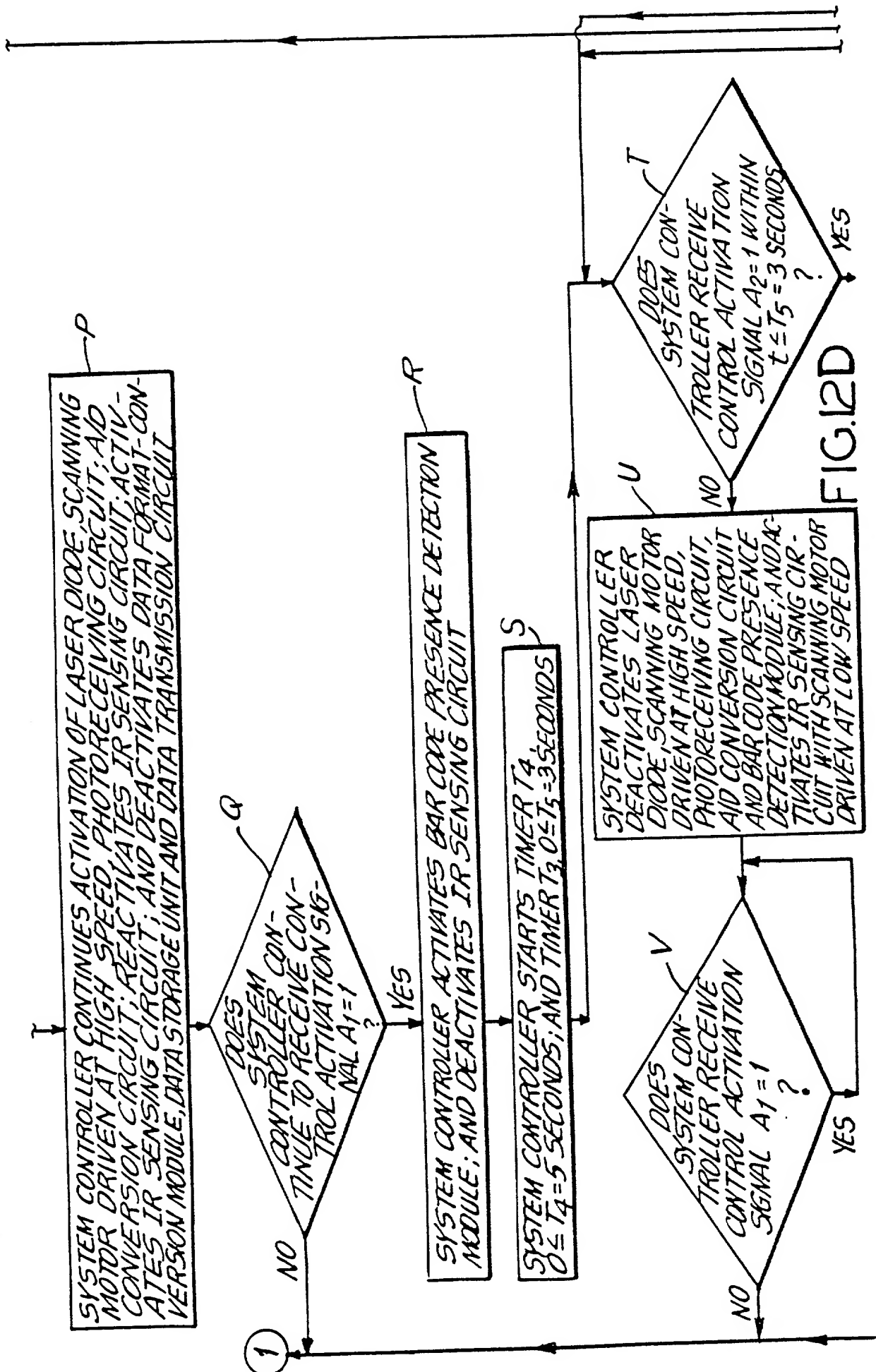


FIG. 12D

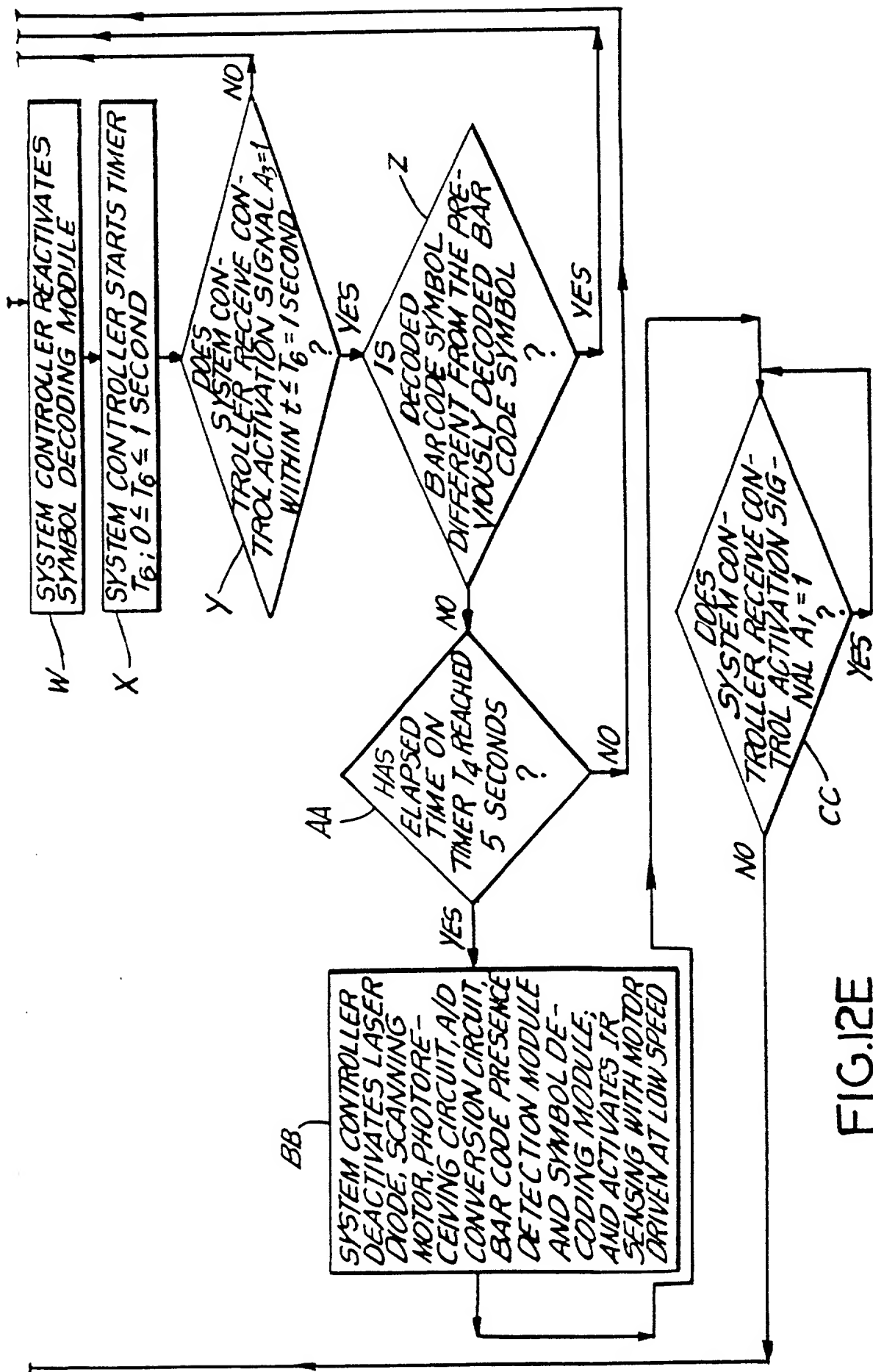


FIG.12E

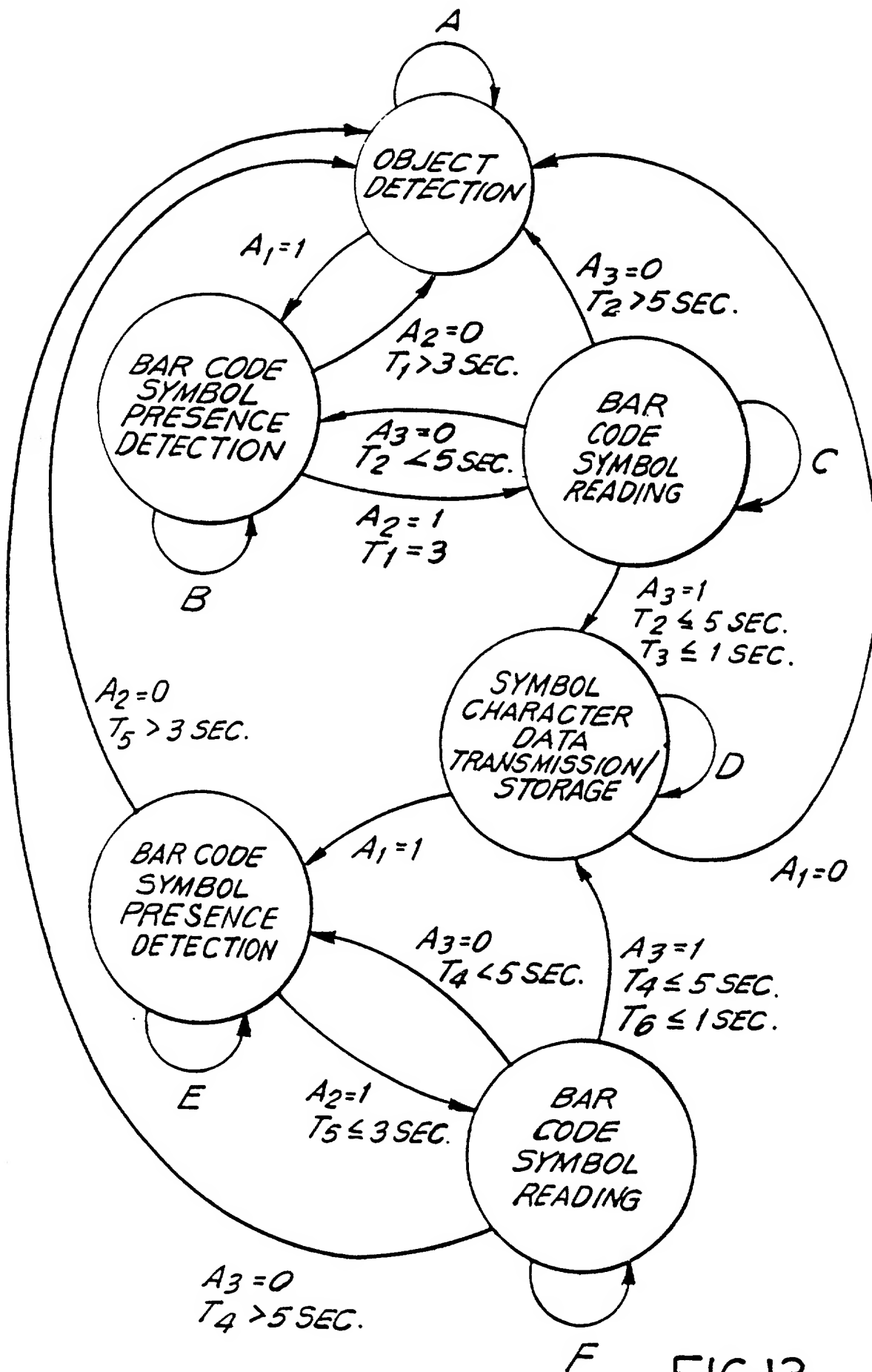
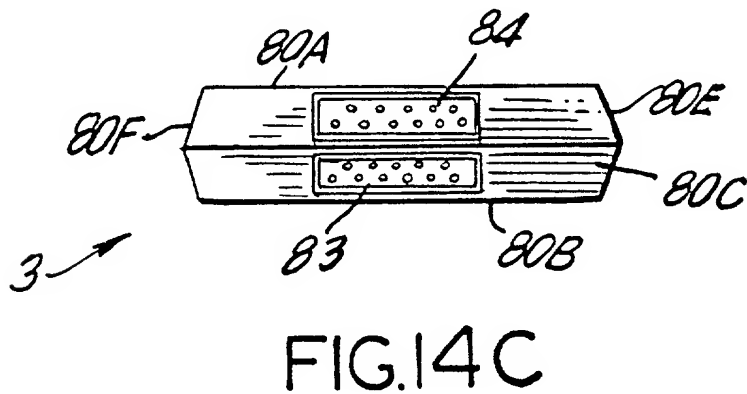
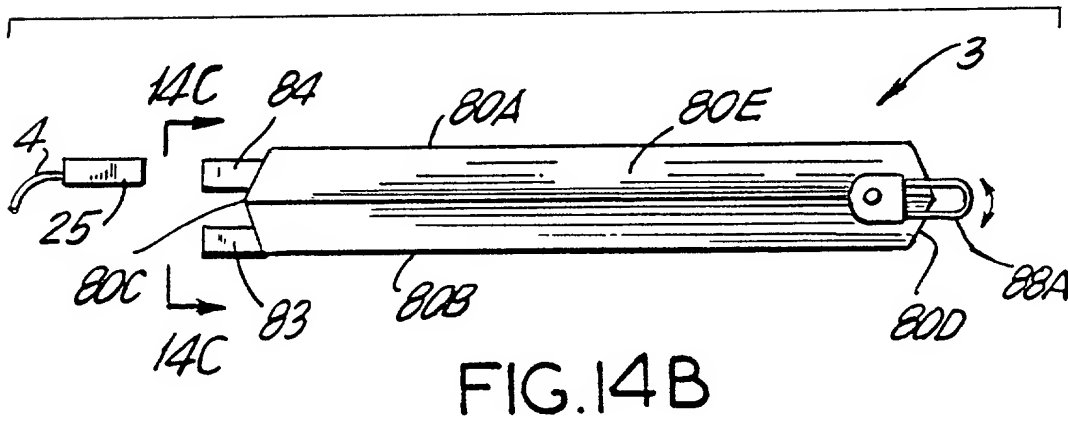
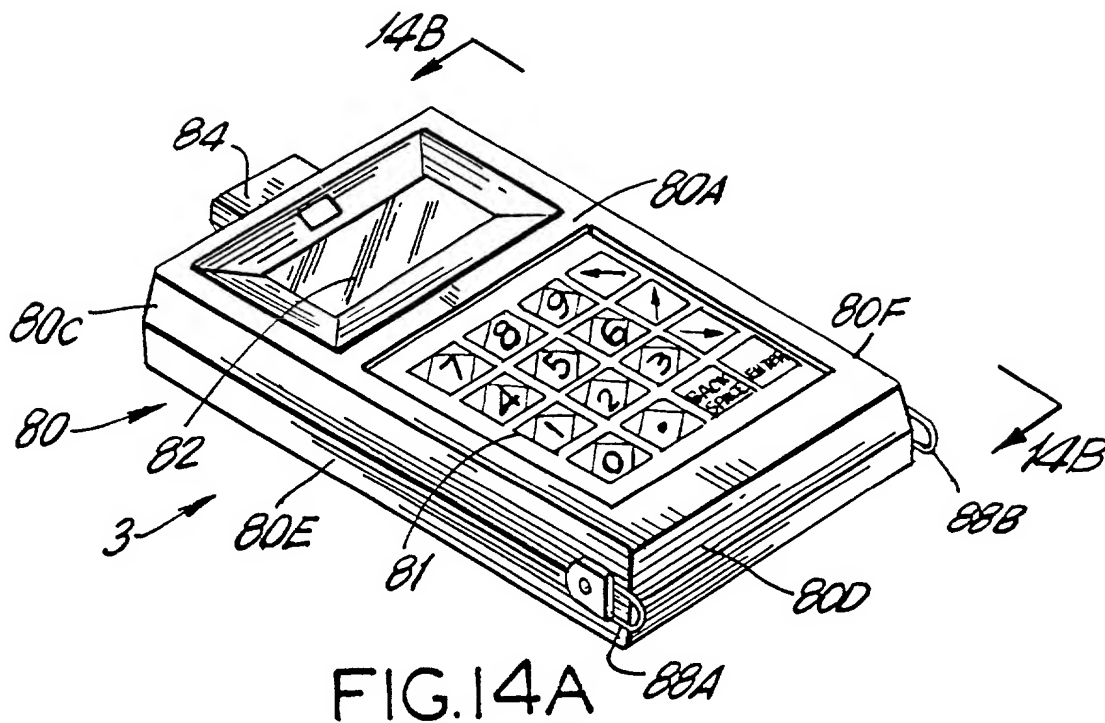


FIG.13



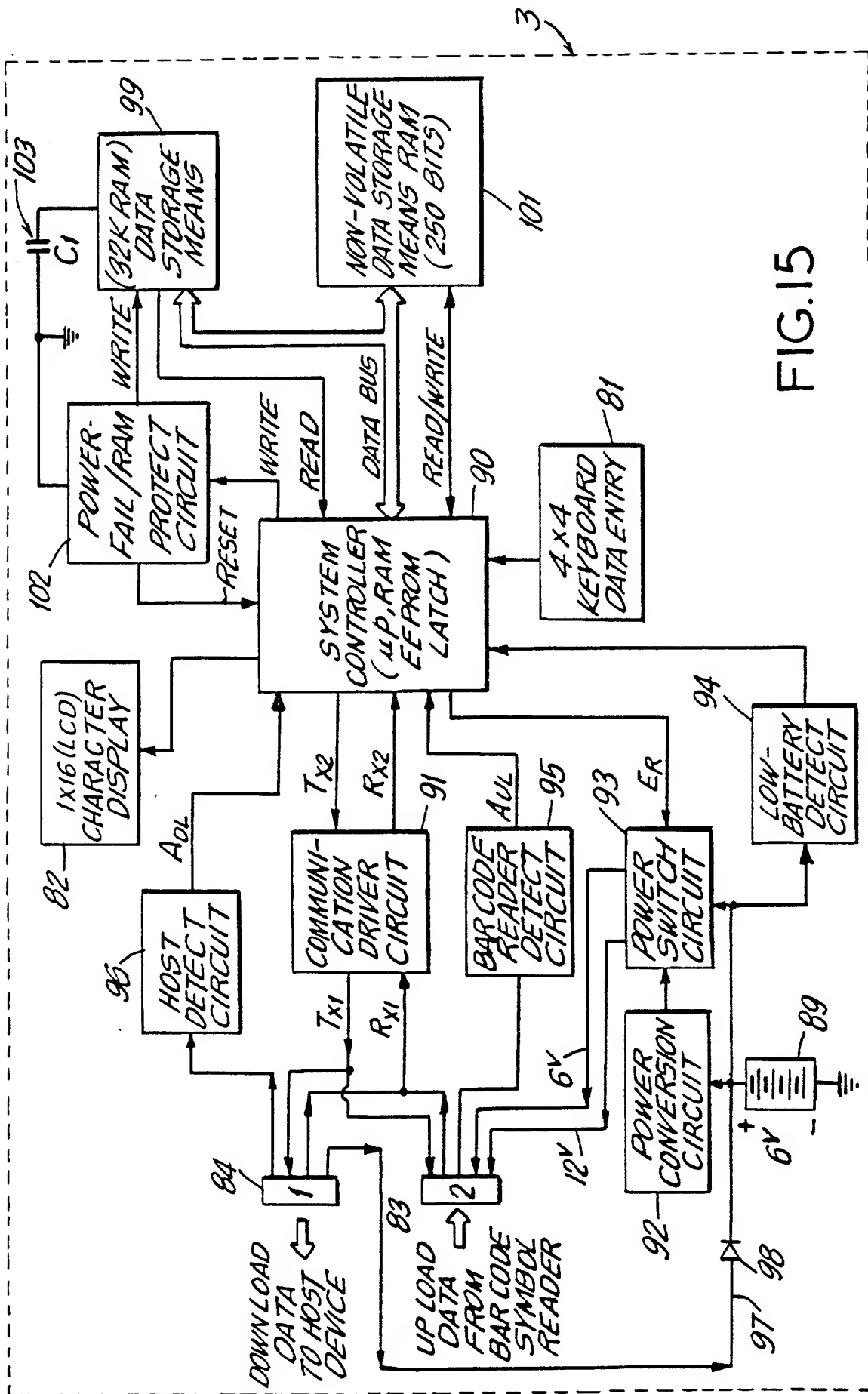


FIG.15



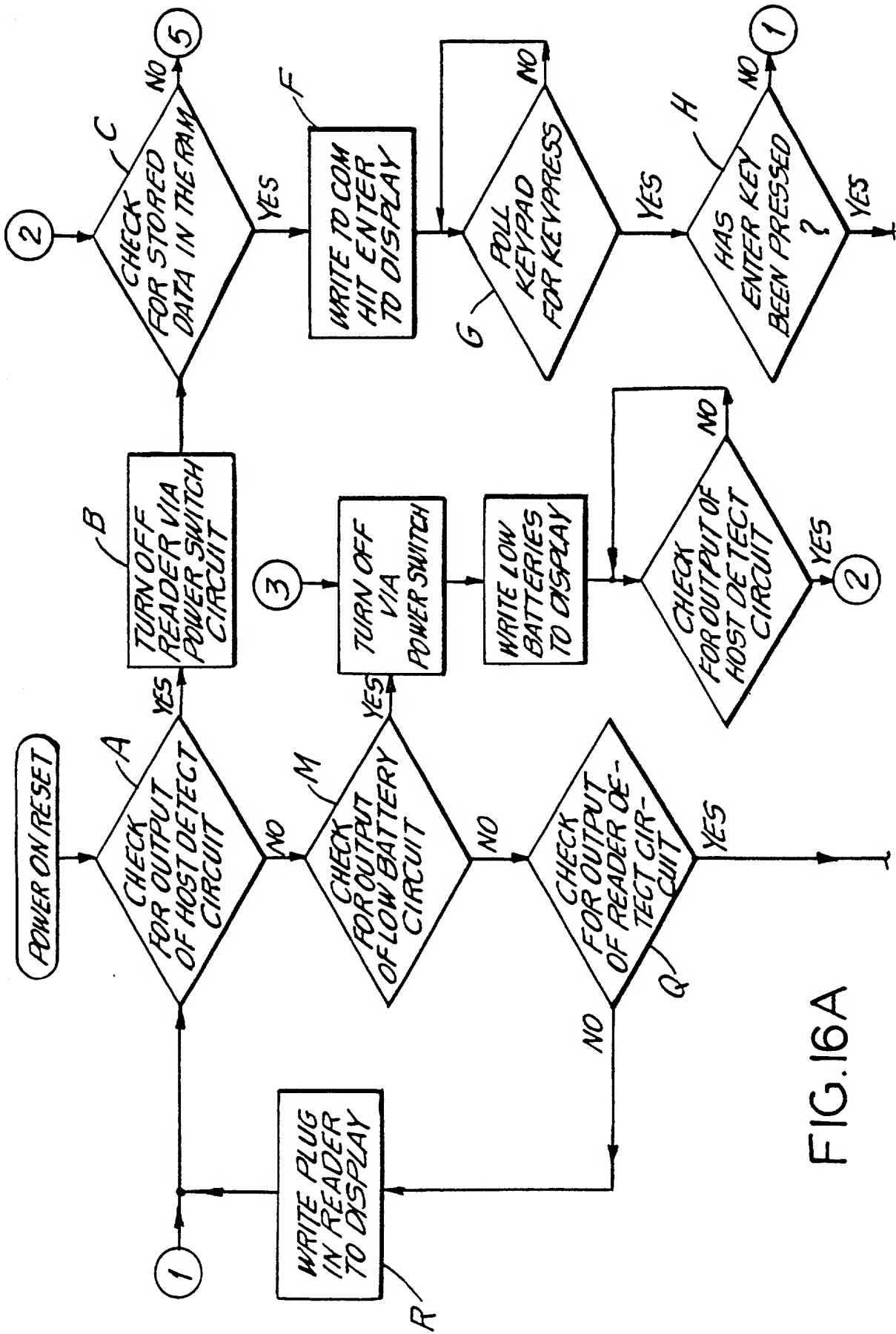


FIG. 16A

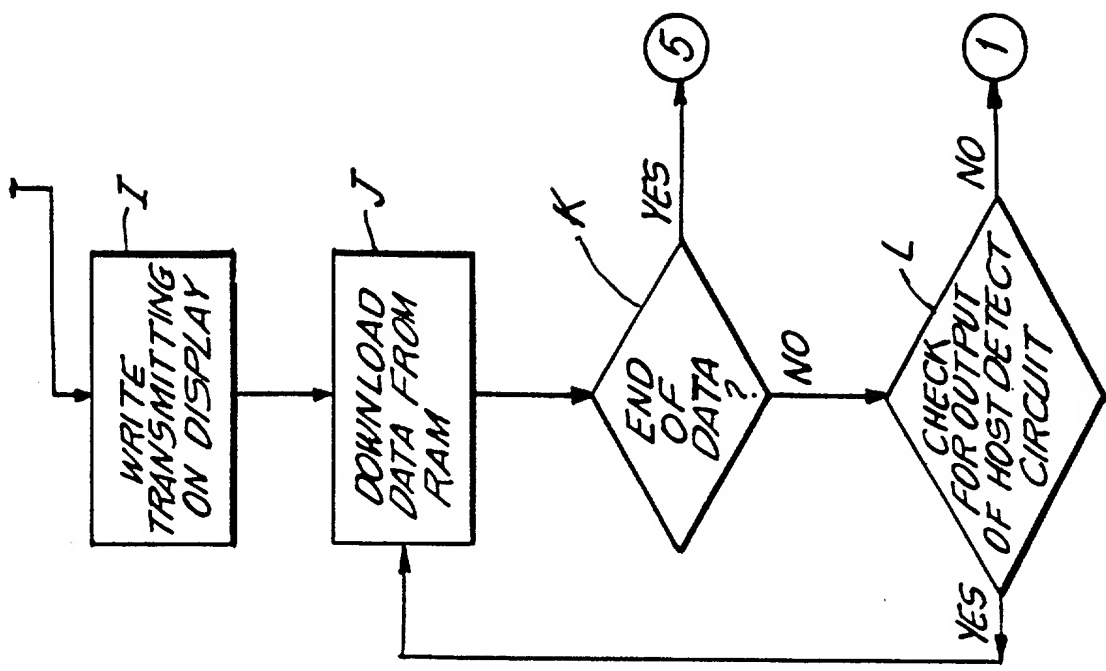
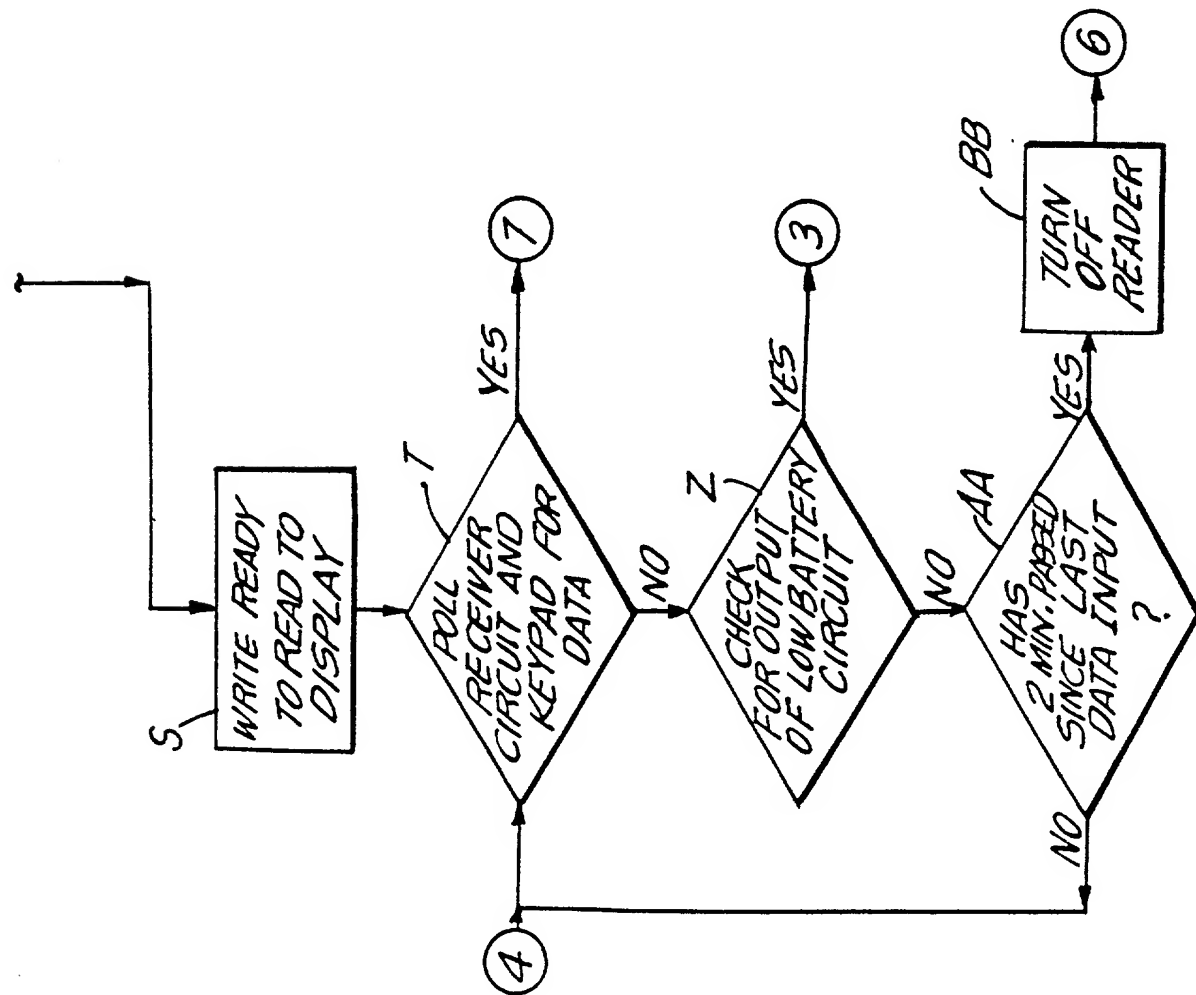


FIG. 16B



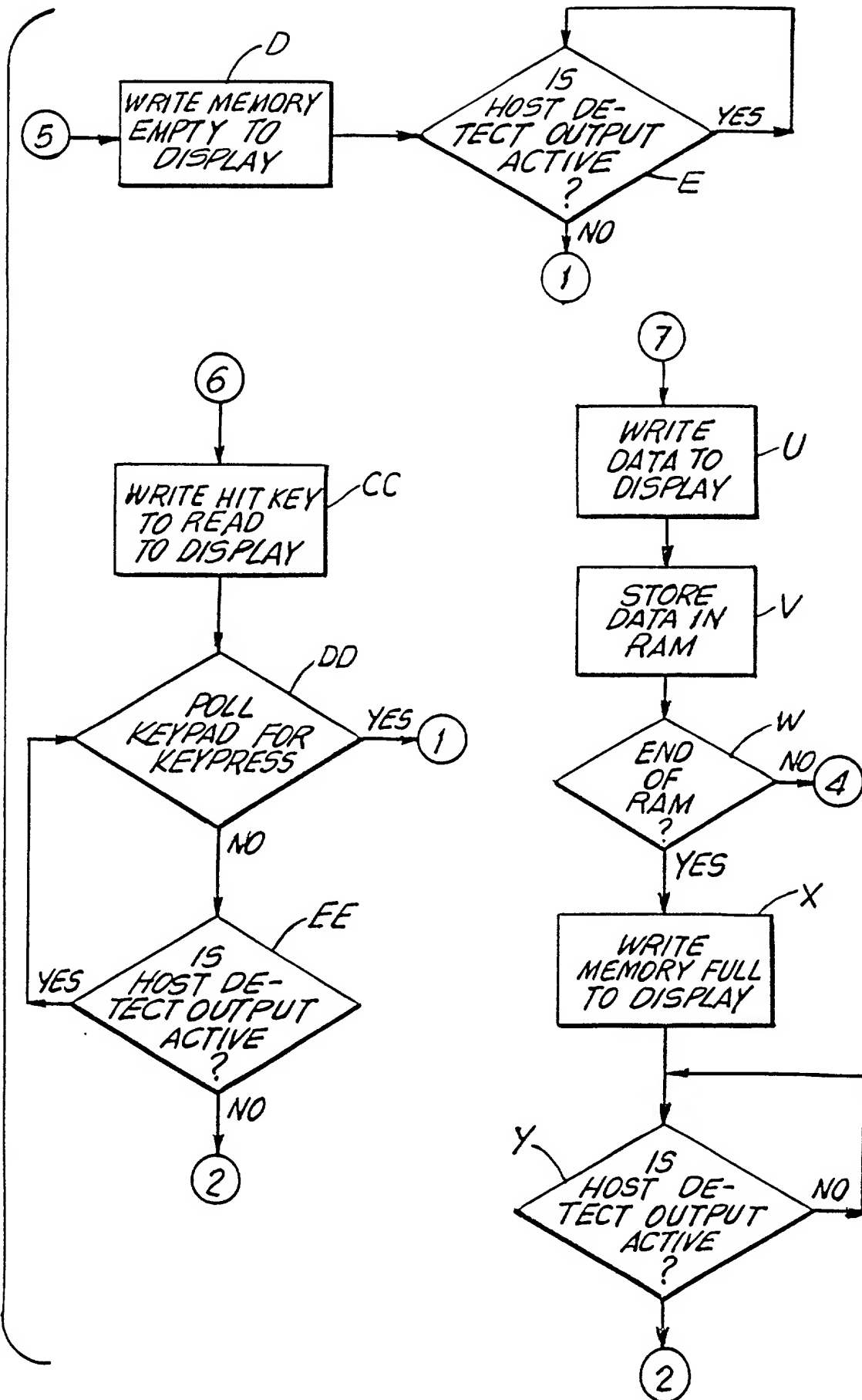


FIG. 16C